GEOLOGIC AND MINERAL AND WATER RESOURCES INVESTIGATIONS IN WESTERN COLORADO, USING SKYLAB EREP DATA

Monthly Progress Report

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EREP Investigation 380
Contract NAS 9-13394

Dr. Keenan Lee
Geology Department
Colorado School of Mines
Golden, Colorado 80401

Submitted to:

Mr. Martin Miller, Technical Monitor
Principal Investigations Management Office
Code TF6
Johnson Space Center
Houston, Texas 77058

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INTRODUCTION

The primary objective of the CSM Skylab Program is to analyze EREP data for geologic information. To this end, the research has been subdivided into the following tasks;

Task I. The PI shall assist NASA/MSC in mission planning activities related to the proposed investigation.

Task II. The investigator will screen all EREP data obtained over Colorado and will select frames for detailed study.

Task III. The investigator will prepare photogeologic maps using selected S-190 photographs, and will analyze them to determine what geologic information may be contained in them.

Task IV. The geological interpretations obtained in Task 3 will be compared to interpretations obtained from S-192 imagery, and to interpretations made from ERTS-I imagery.

Task V. The geological interpretations will be verified by means of interpretation of aerial photographs, published geological reports, and field observations.

Task VI. The investigator will prepare recommendations for the optimum type, scale, and resolution of imagery to be used for studies of regional geology and exploration for mineral deposits and water resources.

Progress

Overall Status

At this time, the progress of the research is as anticipated. The only aspect of the research in jeopardy is the evaluation of S192 data.

Past Month's Activity

The technical paper on shadow enhancement, to be submitted to Photogrammetric Engineering, was completed in December and will be submitted for publication in January 1975 (copy of manuscript enclosed).

Efforts continue to integrate linear investigations and structural data from Skylab/EREP photography. Earlier field work done in support of Skylab will be used for evaluation of structural information from Skylab photography in the vicinity of the intersection of T.34 and T.48.

Some photointerpretation was attempted east of the Front Range in order to evaluate geologic photointerpretation in a nonmountainous terrain. Photographs from T.48 were studied. Stratigraphic units can be delineated where tonal differences are pronounced, as between the red beds of the Lykins Formation and the overlying Morrison Formation; between the grey Benton Shale and the white Niobrara Limestone. The Dakota/Morrison and Benton/Dakota contacts can only be approximated. Only about 50% of the published faults in this area were detected. The broad, southeast-trending Apishapa arch can be delineated on the basis of outcrop pattern and erosional characteristics.

Study of the use of Skylab photography for locating indicators of mineralization in central Colorado is nearing the report-writing stage. This report will include conclusions and recommendations on the effectiveness of Skylab photography in locating indicators of mineralization and the optimum techniques for using these photographs.

Research on the San Juan economic geology project centered on (1) classification of the various San Juan Mountain area calderas as

either resurgent or non-resurgent caldera types, (2) study of regional lineaments, (3) metallogenic significance of caldera resurgence and collapse and development of lineaments, and (4) refinement of the "volcano-tectonic-metallogenic" model as defined by small-scale and large-scale images.

The Pikes Peak batholith study is nearing report stage, with emphasis on preparation of maps and illustrations detailing limitations and use of Skylab, ERTS, and conventional aircraft photography for structural, tectonic, and geochronologic studies of the batholith.

Photointerpretation of Skylab S190B color photos over southwestern Colorado-southeastern Utah continued in December. Detailed interpretations were made on 1:250,000 enlarged transparencies, and these data were then compiled onto topographic base maps at a scale of 1:62,500. Preliminary results indicate that significant additional detail is available on the location and extent of stratigraphic units. Geologic structures, however, were interpreted at about the same level of detail as the original 2X enlargements. Additional photointerpretation will be continued using enlargements at 1:125,000.

Planned Activities for Current Month

Research in January will continue on those projects outlined above.

Travel

There was no travel in December, and non is anticipated in January.

Outlook and Recommendation

Progress continues to be satisfactory and the project should be completed on schedule.

Keenan Lee
Principal Investigator